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EDITORIALS

The determinants of cognitive decline and dementia

Policies and people should aim for good vascular health by age 50

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Two linked research papers illustrate the tremendous power of the Whitehall study and the value of investment in long term cohort studies.[1 2] The most recent Whitehall II study recruited London based civil servants between 1985 and 1988, with decades of follow-up. Although such a cohort can never be representative of the general population's full diversity, important insights have been gathered into influences on health and wellbeing through midlife and later life, including occupational status, types of work, and settings.

The emphasis of Whitehall II has now shifted towards age related conditions, in particular cognition and brain health. These new analyses consider dementia (as a dichotomous outcome) and cognitive decline (as a continuum). In both cases, health service records are used: one for ascertainment of exposure and one for outcome.

The first paper, by Krause and colleagues (doi:10.1136/bmj.l4466), is a clinically oriented study of participants with multiple cognitive measures between 1997 and 2016, linked to hospital admissions.[1] The findings indicate a small, clinically unimportant estimated reduction in cognition associated with admission for major surgery. Medical admissions were strongly associated with cognitive decline, indicating their role as markers of vulnerability and frailty.

To some extent these findings are to be expected. Ideally, the nature of both surgery and anaesthesia would be investigated further, but such detailed data are rare in linkage studies. Also, substantial changes took place in practice between 1988 and 2016, including an increase in both average age and clinical complexity of surgical patients. As day case surgery increased for those who are relatively fit, the implications of hospital admissions have changed over time.

This study is reassuring in that the authors found no large declines in cognition after surgery. Mortality is not tackled, however, and further exploration would be invaluable, as we know that cognition deteriorates towards the end of life and contact with health services accelerates during this time. Importantly, we need to know which risk factors are modifiable and which are not. If some of Krause and colleagues' findings (particularly those linked to non-surgical admissions) are closely related to dying it might be challenging to disentangle the preventable from the inevitable.

The second paper, by Sabia and colleagues (doi:10.1136/bmj.l4414), uses the American Heart Association's cardiovascular health score (also referred to as Life's Simple 7) to investigate the association between cardiovascular health at age 50 and risk of later incident dementia.[2] Cases of dementia were identified from hospital records. This approach will miss many cases, but those people who are identified are likely to have dementia.

Sabia and colleagues found a graded effect—the risk of dementia decreased as cardiovascular health scores increased. Importantly, they derived a single cardiovascular health score at age 50 from the closest data available and did not consider change in this score before and after 50.

The implications from this study and many others are that the healthier the vascular system is in midlife, the lower the risk of subsequent dementia.[3 4] This provides further support for the UK Government's recent policy focus on vascular health in midlife. However, other evidence makes clear that vascular health at 50 is determined by factors earlier in the life course, including inequality and social and economic determinants.[5]

The authors adjusted their analyses for age, sex, education, socioeconomic status, and deprivation and did not report their relations to cognitive outcomes, which limits interpretation of the findings. This approach does not provide the full picture from a public health perspective and could reinforce the limited message that dealing with health in midlife is enough to reduce population risk of dementia.

Missing data are a key challenge in long term cohort studies. In both studies, different techniques are used to account for missing data, although only for participants who drop out, not differentiating those who die. Such strategies are essential to maintain the reliability of the results, but they also need to be transparent. Sensitivity analyses compared the primary method with alternatives, suggesting that the methods were robust to some of the challenges noted.

Reducing the risk of dementia is a leading concern in aging societies. We know that risk can change across generations, and in the UK the prevalence of dementia has decreased by nearly

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25% when standardised for age.[6] Although the Whitehall study cannot reflect the UK's population, estimates obtained from this cohort reinforce the need for action to shift population risk profiles for cognitive decline and dementia across the life course.

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